

NAU Narrung Land System

Very gently undulating plains of the Narrung Peninsula

Area: 198.3 km²

Annual rainfall: 410 – 460 mm average

Geology: The land is underlain by calcarenites of the Bridgewater Formation. Thickness is variable over fossiliferous limestones, lime cemented sandstones and sandy marls of the Morgan-Mannum Formations. The calcarenites are sporadically overlain by windblown Molineaux Sands. Around the margins adjacent to the lakes are deposits of lake bed sediments (St. Kilda Formation equivalent), mainly dark coloured clays, as a veneer over the calcarenites or limestones.

Topography: The System is a broad expanse of gently undulating plains and low rises with occasional fields of moderate jumbled sandhills. Scattered depressions where saline groundwater tables are at or near the surface occur in the south and around the lower elevation fringes nearer the lake shores. Immediately adjacent to the lakes are flats and swamps.

Elevation: 0 - 10 m

Relief: Less than 10 m

Soils: Shallow to moderately deep coarse textured soils over calcrete are predominant, but there are also deep sands and a range of marginally to highly saline soils in depressions.

Main soils

Calcarenite rises and flats

- B3** Shallow loamy sand over calcrete
- B8** Moderately deep to shallow sand over calcrete
- H2** Deep sand

Minor soils

Inland flats and depressions

- A7** Calcareous clay loam
- B5** Shallow alkaline clay
- B2** Shallow calcareous sandy loam
- N2a** Saline calcareous loam

Flats and depressions near the lake

- N2b** Saline clay
- E1** Black cracking clay
- M1** Gradational loamy sand
- F2** Sandy loam over dispersive clay

Main features: The Narrung Land System comprises broad, gently undulating rises with shallow to moderately deep sandy soils over calcrete. These soils are well drained and non saline but are low in natural fertility and often shallow enough to cause spring time moisture stress. In depressions, saline groundwater tables are near the surface and saltpans flanked by a variety of marginally saline soils are prominent. These areas have a complex topography of rises (as for the higher elevation land), mildly to marginally saline flats, and saltpans. There is a similar pattern on the margins of the System adjacent to the lakes. Irrigation is concentrated in these areas because of the proximity to water supply and low elevation. Managing rising watertables and resultant spread of salinity is a key issue, along with fertility improvement.



Soil Landscape Unit summary: 10 Soil Landscape Units (SLUs) mapped in the Narrung Land System:

SLU	% of area	Main features #
MtA MtB Mta	9.3 33.3 29.8	Gently undulating to flat land formed on calcarenites of the Bridgewater Formation. There is minor salinization of depressions. Low sandy rises cover about 10% of the land surface. MtA Very gently undulating flats with less than 2% saline depressions. MtB Gently undulating rises with less than 2% saline depressions. Mta Very gently undulating flats with about 10% saline depressions. Main soils: <u>shallow loamy sand over calcrete</u> - B3 (E), <u>moderately deep to shallow sand over calcrete</u> - B8 (C) and <u>deep sand</u> - H2 (C), with <u>calcareous clay loam</u> - A7 (M) and <u>shallow alkaline clay</u> - B5 (M) in depressions and <u>saline calcareous loam</u> / <u>saline clay</u> - N2a / N2b (M) in salt flats. The land is generally well drained and unaffected by salinity, although additional land, particularly in Mta, is at risk of salinization if watertables rise further. The soils are mostly of low natural fertility and often shallow, and although somewhat marginal for cropping, are mostly suitable for irrigation.
U-B	1.8	Moderate to high jumbled dunes. Main soil: <u>deep sand</u> - H2 (D). These soils are deep and well drained, but highly infertile, susceptible to wind erosion and possibly prone to water repellence. The land has minimal productive potential.
VuH VuR	0.5 11.3	Low lying flats where the lake has inundated the land in the past. VuH Flats. VuR Flats with 20-50% saline depressions, and roughly equal proportions of non saline flats and low sandy or stony rises. Main soils on flats: <u>black cracking clay</u> - E1 (E), <u>gradational loamy sand</u> - M1 (E) and <u>sandy loam over dispersive clay</u> - F2 (E). These soils occupy about a third of VuR, with <u>moderately deep to shallow sand over calcrete</u> - B8 (L) and <u>deep sand</u> - H2 (L) on rises, and <u>saline calcareous loam</u> / <u>saline clay</u> - N2a / N2b (E) in salt flats. The rises are well drained but infertile and often shallow over calcrete, while the flats have more fertile soils, although they are prone to waterlogging and increasing salinity. The salt flats are usually highly saline and have little potential for amelioration.
Vr- Vv-	2.6 1.0	Wetlands associated with the lakes. Vr- Reed beds. Vv- Low lying flats subject to inundation. These wetlands have little agricultural value.
ZC- ZK-	1.4 9.0	Land dominated by saltpans or samphire flats. ZC- Bare salt pans. ZK- Complex of salt pans (at least 50%), marginally saline flats and low rises. Main soil in ZC-: <u>saline calcareous loam</u> / <u>saline clay</u> - N2a / N2b (D). Main soils ZK-: <u>saline calcareous loam</u> / <u>saline clay</u> - N2a / N2b (V) in salt pans, with <u>shallow calcareous sandy loam</u> - B2 (M), <u>calcareous clay loam</u> - A7 (M) and <u>shallow alkaline clay</u> - B5 (M) on flats, and <u>moderately deep to shallow sand over calcrete</u> - B8 (L) on rises. The proportion of saline soils effectively limits the overall use of this land, even though the non-saline soils have some productive potential.

PROPORTION codes assigned to soils within Soil Landscape Units (SLU):

(D) Dominant in extent (>90% of SLU)

(V) Very extensive in extent (60–90% of SLU)

(E) Extensive in extent (30–60% of SLU)

(C) Common in extent (20–30% of SLU)

(L) Limited in extent (10–20% of SLU)

(M) Minor in extent (<10% of SLU)



Detailed soil profile descriptions:

- A7** Calcareous clay loam (Regolithic, Hypercalcic Calcarosol)
Very highly calcareous light grey (gypseous) clay loam with shell beds grading to a grey light clay overlying a buried sand over clay soil from about 75 cm.
- B2** Shallow calcareous sandy loam (Petrocalcic Calcarosol)
Greyish calcareous sandy clay loam with shells grading to a light brown calcareous sand, gleyed with depth over calcrete at about 40 cm.
- B3** Shallow loamy sand over calcrete (Petrocalcic, Leptic Rudosol)
Brown coherent loamy sand over calcrete at about 40 cm.
- B5** Shallow alkaline clay (Petrocalcic, Calcarosol)
Grey calcareous platy clay with increasing carbonate rubble over calcrete at about 25 cm.
- B8** Moderately deep to shallow sand over calcrete (Petrocalcic, Leptic Tenosol)
Brown loose sand with a paler coloured A2 layer overlying calcrete at depths ranging from 40 to 90 cm.
- E1** Black cracking clay (Pedal, Black Vertosol)
Medium thickness hard black cracking clay with coarse blocky structure, becoming greyer and moderately calcareous with depth overlying a buried sand to sandy loam over clay soil at depths ranging from 30 to 100 cm (average 40 cm).
- F2** Sandy loam over dispersive clay (Hypercalcic, Grey Sodosol)
Thin hard sandy loam abruptly overlying a coarsely structured grey clay, becoming sandier and calcareous with depth grading to semi hard carbonate at about 40 cm.
- H2** Deep sand (Basic, Arenic, Brown-Orthic Tenosol)
Brown loose sand with a paler coloured A2 layer becoming yellower with depth and continuing below 100 cm.
- M1** Gradational loamy sand (Calcareous, Regolithic, Grey-Orthic Tenosol)
Thick loamy sand grading to a calcareous light sandy loam over semi hard carbonate from about 60 cm.
- N2a** Saline calcareous loam (Calcarosolic, Hypersalic Hydrosol)
Grey very highly calcareous loam grading to a pale grey clay loam over a white very highly calcareous silty clay loam by about 30 cm, with a watertable within 100 cm.
- N2b** Saline clay (Dermosolic Hydrosol / Aquic Vertosol)
Thin (may be absent) dark clay loam over a dark grey stiff clay, becoming lighter grey with yellow mottles at depth. Gypsum crystals and iron segregations are common. Sandier lenses with shells may occur below 100 cm. Highly saline watertable usually within 100 cm.

Further information: [DEWNR Soil and Land Program](#)

